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(54) Title: SYSTEMS AND METHODS FOR PREVENTING CAMCORDER PIRACY OF MOTION PICTURE IMAGES

(57) Abstract: Novel systems and methods for preventing piracy of motion picture images by recording the images as they are displayed on a movie screen, using a camcorder as a recording device. Two alternative anti-piracy systems and methods are described. The first method is to vary the frame rate of the displayed motion picture images in a random fashion, thus preventing the camcorder from synchronizing its internal frame rate with that of the displayed motion picture image. The second method is to transmit pulsed energy with frequencies in the frequencies of visible light, such as red light in a manner with sufficient transmitted power or frequency to degrade the quality of the recorded image by the recording device. The result is significantly degraded quality of the recorded ima ges. The two embodiments can be used alone or in combination.

# SYSTEMS AND METHODS FOR PREVENTING CAMCORDER PIRACY OF MOTION PICTURE IMAGES

## BACKGROUND OF THE INVENTION

### Field of the Invention

This invention is directed to methods and systems for preventing the piracy of motion picture images from motion picture theaters. More particularly, this invention is directed to the prevention of unauthorized duplication of motion pictures by use of a recording device to record the motion picture images while being displayed on a motion picture screen.

### Description of the Related Art

Presently, the motion picture industry is routinely victimized by the presence of unauthorized duplicates of a motion picture. The unauthorized duplications detract from the revenues that would be otherwise generated by a lawful sale of viewing time, such as the tickets sold at for viewing the motion picture at a theater. The end result of these acts of piracy is to deny the motion picture industry the full enjoyment of the ownership benefits afforded to their work under Copyright laws and in realizing the full profit potential of their work.

One widespread method by which unauthorized duplicate are generated involve the use of portable recording devices, such as handheld camcorders. In a typical piracy scenario, a handheld camcorder is usually carried into the movie theater and positioned in such way as to provide the input lens with a substantially unobstructed view of the display screen. The camcorder's input circuitry then captures the projected motion picture images from the display screen and records them onto a recording medium, such as a video tape. The foregoing act of piracy is particularly detrimental to the motion picture industry because the unauthorized copy is made when the motion picture is normally at the height of its expected revenue generating period, namely while it is being displayed in the movie theaters.

Additionally, the recording medium on which the illegally recorded motion picture has been stored can itself be subsequently duplicated further by conventional means and outside of the movie theater, into several copies. These subsequent reproductions are often done in large numbers, and then illegally sold. The sale of these duplicates in turn further contribute to diminish the motion picture industry's rights to earn from their protected intellectual property.

The piracy of a motion picture by use of a camcorder is made possible when a camcorder's recording rate is synchronized with the frame rate of an electronic projector. Currently, one method for hampering the camcorder piracy is by disrupting the necessary synchronization between the recording rate of the camcorder and the shutter of a mechanical or

fixed frame rate electronic projector. The lack of synchronization will result in a substantial degradation in the quality of the recorded motion picture. The details of one such method is set forth in U.S. Patent 5,680,454 the disclosure of which is incorporated herein by reference.

The prior art, however, suffers from several shortcomings, one of which is the inability to provide a method to achieve the desired lack of synchronization (by preventing the camcorder to re-synchronize with the electronic projector) has taken place. In this regard, the U.S. Patent 5,680,454 proposes a pseudo random generator to vary the frame rate of a video electronic projector. As will also be explained in greater detail in the detailed disclosure, the system disclosed in the prior art does not necessarily generate the same number of frames below the reference frame rate, thus synchronization of audio and video is not ensured.

What is needed is a technology that will ensure a continued lack of synchronization throughout the display time of the motion picture, thus to thwart a camcorder's efforts to record the motion picture without suffering a substantial degradation in the quality of the recorded picture.

## SUMMARY OF THE INVENTION

It is the object of the present invention to address the foregoing shortcomings in the prior art by providing two systems and methods for preventing camcorder piracy, each of which can be used independently, or in combination.

In one aspect, the present invention is a system and method for preventing the piracy of motion picture images. The system includes a randomizer subsystem to randomly vary the display rate of one or more frames of an electronically projected displayed motion picture image.

In an exemplary embodiment of this aspect of the present invention, a random process generator subsystem and a frame rate timing subsystem are used to vary the frame selection and display rate of a motion picture bit stream in order to hamper the ability of an unauthorized recording device to synchronize its recording rate with that of display rate, thus substantially degrading the quality of the recorded motion picture.

In another aspect, the present invention is another system and method for preventing piracy of motion picture images. The system includes a transmitter subsystem to transmit adverse energy to a recording device to degrade the images recorded by the recording device from a display screen.

In an exemplary embodiment of the present invention, a set of energy sources directed to the recording devices transmit energy waves with sufficient intensity to degrade the images

recorded by the recording devices. The energy sources are optimally positioned and/or sufficient in number to substantially cover the motion picture display area.

This brief summary has been provided so that the nature of the invention may be understood quickly. A more complete understanding of the invention can be obtained by reference to the following detailed description of a preferred embodiment thereof and to the drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of the first embodiment the present invention for preventing piracy of motion picture images.

FIG. 2 is a diagram of the noise generator circuit.

FIG. 3 is diagram illustrating the workings of the various components of the first embodiment of the present invention as illustrated in FIG. 1.

FIG. 4 is a block diagram of the second preferred embodiment of the present invention for preventing piracy of motion picture images.

## DETAILED DESCRIPTION OF THE INVENTION

The systems and methods of present invention disclosed herein are directed to the prevention of unauthorized duplication of motion pictures by use of a recording device to record the motion picture images while being displayed on a motion picture screen.

FIG. 1 illustrates the overall system architecture of the first embodiment of the present invention. The system includes a randomizer subsystem 1 to randomly vary the display rate of the projected motion picture images.

Referring to FIG. 1, the randomizer subsystem 1 further includes three main subsystems of: 1) a Frame rate pattern function subsystem 10; 2) a Random Process Generator Subsystem 30; 3) and a Frame rate timing subsystem 20. The working of each of these main subsystems will now be disclosed in greater detail.

1. Random Process Generator Subsystem: The random process generator subsystem 30 utilizes a random function for generating the sector select signal 31 used to select a frame rate pattern function stored in the memory module of the frame rate pattern function subsystem 10.

The random function is based on the electrical noise derived from at least one physical process that generate an electrical noise. The electrical noise is the result of the naturally occurring physical process of thermal agitation of electrons in an object, generally an electrically conductive object. Conductive objects have in general an inherent abundance of

free floating electrons, which when exposed to external physical stimuli such as heat or radiation would become thermally agitated and move about in a completely random fashion. The moving electrons would then randomly collide with one another, producing heat which can be subsequently registered as electrical noise. The sheer number of electrons would render each collision configuration a unique set and hence the resulting electrical noise would be unique as well. In addition, even the most minute changes in the intensity and/or duration of the external physical stimuli such as heat would produce a different level of thermal agitation which would further augment the uniqueness of each collision configuration.

FIG 2, illustrates an exemplary embodiment of this aspect of the present invention in form of the noise generator 2. As illustrated in FIG 2, the analog noise generator unit 20 contains a resistor unit 21 and an amplifier unit 22. The resistor unit 21 is used as the resistive object that naturally generates electrical noise although other resistive objects such as other electrical resistors or diodes such as a zener diode can also used and are anticipated to be within the scope of the present invention.

The resistor unit 21 generates the electrical noise which is outputted in form of an electrical signal that is inputted into the amplifier unit 22 for signal amplification. The amplifier output is then sent to a sample and hold unit 23 which would select a snap-shot sample of the amplifier's generally continuous output and forward it to the Analog to Digital (A/D) convertor unit 24 for a digital version of the resistor's analog output. The A/D 24 would then also reconfigure the digital output into a bit sequence which constitutes the sector select signal 31. In an exemplary embodiment, a 10 bit sequence is used for the sector select signal 31 although a bit sequence of any length can also be used and are anticipated to be within the scope of the present invention.

One advantage of the foregoing feature of the present invention over the prior art is that the present invention does not rely on a pseudo-random generator which utilize mathematical algorithms for generation of random numbers, the use of which is prone to predictability upon careful study of the algorithmic process. In the present invention, the random function is the result of a naturally occurring physical process that is unique in each occurrence and hence truly random and unpredictable in output generation from one function to the next.

In an exemplary embodiment of the present invention illustrated in FIG. 1, the random process generator subsystem 30 is used at regular occurring time periods, for example at one second intervals. The timing of such interval are provided by the frame clock 15 received from the frame rate pattern function subsystem 10, described below.

2. Frame Rate Pattern Function Subsystem:

As illustrated in FIG. 1, the frame rate pattern function subsystem 10 includes a parser unit 11, a memory address unit 12, a read only memory unit 13, and a numerically controlled oscillator (NCO) 14.

The motion picture images in form of image bit-streams are received by the parser unit 11. The image bitstream is generally in form of packets which contain an information portion along with a header portion which generally instructs the recipient system on how to process the information portion of the packet. In the present invention, the information portion of each packet contains the motion picture image data 18, while the header portion contains information on the frame clock 15. The parser unit 11 separates the incoming motion picture images bitstream packets into its constituent motion picture image data 18 and the frame clock 15. The frame clock 15 is then forward to the memory address unit 12 and also to the random process generator subsystem 30. The motion picture image data 18 is forwarded to the frame rate timing subsystem 20.

The frame clock 15 is forwarded to the memory address unit 12 which utilizes the timing information contained in the frame clock 15 along with the sector select 31 to select the proper operating information from RAM 13. The NCO 14 then receives the output of RAM 13 based on which it generates a pixel clock 16 forwarded to the frame rate timing subsystem 20.

FIG. 3 discloses in greater detail the workings of the memory unit 12, RAM 13 and NCO 14 which interact to vary the frame rate of a projected motion picture so that a recording device attempting to record the screen display will be unable to maintain synchronization.

The memory address unit 12 stores in a memory module a number of pattern function sets, with each pattern function set being in odd function symmetry about the motion picture image frame rate, such as symmetric about 24 frames per second. Each pattern function set must be symmetric about the motion picture frame rate to ensure that the images remain in synchronization with the audio portion of the motion picture. In an exemplary embodiment, pattern function generators are stored on a programmable medium such as an Electrically-Erasable Programmable Read Only Memory (EEPROM) typically during the projector manufacturing process. The EEPROMs can generate sets of pattern functions to be used in the memory address 12.

As illustrated in FIG 3, a different set of pattern functions is loaded in form of a set of N-bits sequences 34 into each word sectors 35 stored in the RAM 13. In an exemplary embodiment, the N-bits sequences 34 are 14 bits in length although any length can be used.

Within each set of N-bits sequences 34, a different N-bits component 34 is loaded into each word within a sector 35.

The overall flow of the process is regulated by the frame clock 15 inputted into the state counter 32. The state counter 32 further subdivides the each time interval of frame clock 15 into a number of subintervals that correspond to the number of words in a sector. In an exemplary embodiment of 24 words per sector, each sector would correspond to one second of motion picture time and with each second of the frame clock 15 subdivided into 24 segments of equal time lengths of 1/24 seconds.

At the beginning of each time interval of frame clock 15, the bit sequence in the sector select signal 31 determines an individual sector 35 to be used. As described above the bit sequence in the sector select signal 31 is generated by the true random generation process of random process generator subsystem 30 and thus results in the selection of each sector in a completely random fashion.

To better illustrate the workings of the present invention, here the first sector "0" is shown to be have been chosen by the sector select signal 31 as an example, although any sector 35 can be selected with equal effectiveness.

As illustrated in FIG 3, each sector 35 is further subdivided into a number of words which typically correspond to the motion picture image frame rate, for example, 24. In an exemplary embodiment as illustrated in FIG. 3, each sector 35 is made up of 24 words marked 0-23. Upon selection of a sector 35, each word in the sector is then further selected, typically in a sequential fashion starting with word 0 and ending in word 23. Since the set of frame rates must average the motion picture image frame rate to 24 frames per second during the time interval, the 24 words per sector are used once during each sector usage.

At the beginning of each time subdivision of the frame clock 15 by state counter, the N-bit pattern 34 associated with each selected word within a sector is forwarded to the numerically controlled oscillator (NCO) 14 and loaded into the NCO counter 31. The NCO counter 31 is typically a holding register which also receives as input a frequency from the frequency generator 30. The NCO counter 31 then divides the received frequency by the N-bit pattern to calculate the pixel clock 16.

Next, the state counter 32 sequentially advances time to the next subdivision of the frame clock 15, for example the 2nd subdivision out of 24, and the next word in the sector is selected sequentially, for example word 1. The N-bits of that word is then sent to the NCO 14, resulting in another calculation of pixel clock 16. Since each N-bit sequence is different, a different pixel clock 16 is generated each time.

The process continues until the N-bits in all words are sent to the NCO at which point a new sector select signal 31 is generated, selecting another sector 35. Since the frame clock 15 also controls the generation of the sector select signal 31, each time interval of frame clock 15 such as one second results in the generation of a new sector select signal 31 and coincides with resetting of the state counter 32 and hence the selection of the first word in a selected sector 35. Thus for example each time that 8,294,400 clock pulses have been generated, a new frame clock 15 is created which advances the memory address by one word. This is repeated until the end of the time interval, for example, one second.

One advantage of the foregoing features of the present invention is that even if a camcorder pirate succeeds in studying the frame rate patterns to determine each set of symmetric pattern functions, the pirate would still not knows that in a particular second, which of the symmetric functions will be used due to the truly random selection of sectors by the sector select signal 31. Thus, the pirate camcorder would not be able synchronized the camcorder with the electronic projector.

3. Frame Rate Timing Subsystem: The motion picture image data 18 and pixel clock 16 output signals generated by the frame rate pattern function subsystem 10 are received by the frame rate timing subsystem 20 which utilizes the received signals to time the projection of the motion picture images by the electronic projector display system 50 onto a display screen.

The pixel clock 16 determines the frequency rate by which each frame of the motion picture image data 18 is to be displayed, thus by randomly varying the pixel clock 16 as described above, the frequency rate by which each frame of the motion picture image data 18 is displayed is also randomly changed. The result is that a recording device attempting to record the screen display will be unable to maintain synchronization.

In an exemplary version of the present invention the motion picture image frame rate is run at 24 frames per second, resulting in the pixel clock 16 having a variable frequency ranging between $1.82476 * 10^8$ to $2.15654 * 10^8$ clocks per second which corresponds to 22 to 26 frames per second for a 8,294,400 pixel writing tile.

Specific examples of parameter values are used for illustration purposes only with all of the parameters being changeable without affecting the utility of the present invention and such changes are anticipated to be within the scope of the present invention.

4. Communication Interface:

In an exemplary embodiment of the present invention as illustrated in FIG. 1, a communications interface 40 is optionally provided so that the operations of the randomizer subsystem 1 can be monitored and/or modified from remote sites. One or more remote sites can transmit the motion picture image bitstream used by the frame pattern function subsystem 30, and receive various operational and status feedback from the various subsystems of randomizer subsystem 1.

The optional communications interface 40 may also be used to provide the randomizer subsystem 1 with the capability of downloading pattern functions for the memory address unit 12 via a communications interface from a remote site. The new pattern functions can be included in the motion picture image bitstream, for example in the header portion and forward to the memory address unit 12. In the same way, the communications interface 40 can also be used to remotely replace stored pattern functions, or to change the periodicity of the selection of the pattern functions, such as, for example, changing selection periodicity from selecting a function once a second to twice a second. The communications interface 40 can be further used to remotely modify parameters of the pattern functions, such as the excursion from the nominal motion picture image frame rate.

In an exemplary embodiment, the function generators in the memory address unit 12 are stored on programmable mediums such as an Electrically-Erasable Programmable Read Only Memory (EEPROM). The communications interface 40 can be further used to remotely re-program the EEPROMS with modified information such as changed parameters for the pattern functions.

FIG. 4 illustrates the overall system architecture of the second embodiment of the present invention for preventing piracy of motion picture images, using a transmitter subsystem 5 that transmit energy beams to the input circuitry of the recording device resulting in a substantial degradation of the quality of the images recorded by the recording device from the display screen.

Referring more particularly to FIG. 4, the subsystems of the transmitter subsystem 5 are:

1. Energy Sources:

The energy sources 50 generate and transmit energy beams 55 toward the recording devices in the movie theater to degrade the quality of the motion picture recorded.

Recording devices such as camcorders generally include an input circuitry which captures incoming light such as those of a projected motion picture image, and converts them

into electrical signals for later image processing. The input circuitry is generally an array of photo-detectors such as light sensitive charged coupled devices (CCD) typically made of MOS capacitors. When exposed to the photons of incoming light, electron-hole pairs are induced in the MOS capacitors. The MOS capacitor collects these electrons at its many sensors, forming electron packets that are subsequently converted into useful electrical signals.

All CCDs, however can be adversely affected by an incoming surge of bright light resulting in an effect called "blooming". The bright light causes an excess generation of electrons which would first saturate a CCD sensor before overflowing to other sensors in the CCD creating a deluge. The effect of the overflow is detrimentally reflected onto the recorded picture in form of an undesirable obscuring blotch at the place most exposed to the bright light. A sufficiently bright light or successive exposure to a bright light source, can cause the resulting blotch to substantially cover the entire recorded image, thus substantially degrading the quality of the recorded picture.

In the present invention, this blooming effect is induced by the energy beams 55 that are transmitted at a color frequency range that lies within the frequency range of light visible to the human eye but transmitted in pulses of such duration and periodicity as to remain undetectable by the viewer. Any color frequency can be used for transmission. One advantage of the foregoing method is that because the frequency range is within that of visible light, an optical filter may not be effectively used to block the signal without itself causing substantial detrimental impact on the motion picture image signal being received by the recording device from the display screen.

In an exemplary embodiment of the present invention, the energy sources 50 generate and transmit frequencies in the frequency rate of red light, utilizing a red laser for example, with the energy beams having a duration of approximately 20 microseconds and occurring with the periodicity of less than every one-half seconds.

The energy sources 50 are also pulsed on and off using a pseudo-random generator or a true-random generator, in the fashion disclosed above for the first embodiment of the present invention, to provide a signal of variable pulse width and periodicity. These pulses are of sufficient transmitted intensity to cause a blooming effect on the input circuitry of the recording device while regulated based on a timing cycle set to effectuate a resulting low average energy, so as to not cause the presence of red light to become detectable by the viewer.

Thus by providing sufficient transmitted power to cause a blooming effect on the input circuitry of the recording device, the energy sources 50 cause substantial degradation in the quality of the recordings of the camcorder.

In an exemplary embodiment of the present invention, one or more of energy sources 50 are mounted on the display screen, and oriented so that the transmitted energy beams radiate towards the viewers in a motion picture theatre, preferably at the level of camcorder lens, and with sufficient transmitted power to substantially degrade the quality of the recorded images by recording devices even if the recording devices are positioned at points in the theater that are farthest from the display screen.

2. Electronic Driver Modules:

As illustrated in FIG. 4, one or more electronic driver modules 51 provide operational data via electronic instruction signals to control the energy sources 50. These instructions include, though not limited to, instructions to set and adjust the power intensity of the transmitted energy beam, instructions to set and adjust the transmitted frequency or frequencies of the energy beams, instructions to set and adjust pulse width and periodicity of the energy, and to control switching functions to switch between alternate output frequencies of the energy sources 50.

In an exemplary version of the present invention, the electronic driver modules 51 varies the frequency of the energy source 50 utilizing a random function generator to determine the periodicity of the switching function.

3. Communication Interface:

In an exemplary embodiment of the present invention, a communications interface 54 is optionally provided so that the operations of the transmitter subsystem 3 can be monitored and performed from remote sites. One or more remote sites can transmit the operational data used by the electronic driver modules 31 to signal the energy sources 30, and receive various operational and status feedback from the various subsystems of transmitter subsystem 3.

In a third embodiment, the foregoing second embodiment feature of the present invention may also be used in combination with the foregoing first embodiment of the present invention.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.

WHAT IS CLAIMED IS:

1. A system for preventing the piracy of motion picture images comprising:

a randomizer subsystem to randomly vary the display rate of one or more frames of an electronically projected displayed motion picture image.

2. The system of Claim 1 said randomizer subsystem further comprising:

a frame rate pattern function subsystem to process received motion picture image bit-stream;

a random process generator subsystem to provide an input to the frame rate pattern function subsystem; and

a frame rate timing subsystem to process motion picture image data received from the frame rate pattern function subsystem and to output the processed image data onto an electronic projector display system.

3. The system of Claim 2, said frame rate pattern function subsystem further comprising:

a parser unit to receive a digital motion picture image bit stream as input, to parse from said motion picture image bit stream and a frame clock component, and to forward the motion picture image data bit stream to the frame rate timing subsystem;

a memory address unit to receive as inputs a sector select signal from said random process generator subsystem and said frame clock component from the parser unit, and to advance at least one memory address based on the information provided by said frame clock and said sector select signal;

a random access memory unit to receive as input information provided by the memory address unit; and

a numerically controlled oscillator to receive as input information provided by the random access memory unit, to generate as output a varying pixel clock data and to forward said data to the frame rate timing subsystem.

4. The system of Claim 3, wherein the access memory to determine which sector of the random access memory module is to be used during an ensuing interval based on the data received from the memory address unit.

5. The system of Claim 2, wherein the random process generator subsystem generates said sector select signal.

6. The system of Claim 5, wherein the random process generator subsystem generates said sector select signal based on the electrical noise derived from at least one physical process generating said electrical noise.

7. The system of Claim 6, wherein said physical process is the thermal agitation occurring in at least one resistive object.

8. The system of Claim 7, wherein said resistive object is an electrical resistor.

9. The system of Claim 7, wherein said resistive object is a diode.

10. The system of Claim 2, wherein the frame rate timing subsystem receives as input said varying pixel clock data and motion picture image data from the frame rate pattern function subsystem, multiplexes the received clock and image data into a varying frame rate motion picture image bit stream, and forwards said multiplexed data to the electronic projector display system.

11. The system of Claim 2, said randomizer subsystem further comprising:

a communications interface to relay from an external source operational data parameters for the random process generator subsystem, and/or for the frame rate pattern function subsystem.

12. A system for preventing piracy of motion picture images comprising:

a transmitter subsystem to transmit pulses of energy to a recording device to degrade the images recorded by the recording device from a display screen.

13. The system of Claim 12, wherein said transmitted energy is of sufficient intensity to substantially degrade the quality of the recorded images by the recording device.

14. The system of Claim 12, wherein the energy is transmitted in frequencies within the frequency range of red light.

15. The system of Claim 13, wherein the energy is transmitted in pulses of on-and-off, said pulses to be of such duration and periodicity as to substantially degrade the quality of the recorded images by the recording device.

16. The system of Claim 15, wherein at least one random generator determines said duration and periodicity of said pulses of on-and-off.

17. The system of Claim 16, wherein said random generator is a pseudo random generator.

18. The system of Claim 16, wherein said random generator is a true random generator.

19. The system of Claim 12, said transmitter subsystem further comprising:
one or more energy sources to transmit said energy; and
an electronic driver module to send one or more operational data to control the energy sources.

20. The system of Claim 19, wherein said operational data to control the energy sources includes instructions to set and adjust power outputs, frequencies, pulse width and periodicity of said energy, and to control switching functions to switch between alternate output frequencies of said energy sources.

21. The system of Claim 19, wherein a random function generator provides the timing data in said operational data said timing data to control the timing for the said set and adjustment of power outputs, frequencies, pulse width and periodicity of said energy, and for said control switching functions.

22. The system of Claim 19, said transmitter subsystem further comprising:
a communications interface to rely from an external source input parameters to the electronic drive module in said operational data sent to control the energy sources.

23. The system of Claim 19, wherein said energy sources are of sufficient quantity and/or positioned in such way as to provide substantial coverage of the viewing area in which the motion picture images are displayed.

24. A method for preventing the piracy of motion picture images comprising:

utilizing a randomizer subsystem to randomly vary the display rate of one or more frames of an electronically projected displayed motion picture image.

25. The method of Claim 24, said utilizing of the randomizer subsystem further comprising:

processing received motion picture image bit-stream in a frame rate pattern function subsystem;

providing an input to the frame rate pattern function subsystem with a random process generator subsystem;

processing motion picture image data received from the frame rate pattern function subsystem in a frame rate timing subsystem; and

outputting the processed image data onto an electronic projector display system.

26. The method of Claim 25, wherein the processing of received motion picture image bit-stream further comprising:

receiving the digital motion picture image bit stream as input to a parser unit;

parsing a motion picture image bit stream and a frame clock component from said motion picture image bit stream using said parser unit;

forwarding the motion picture image data bit stream to the frame rate timing subsystem;

advancing a memory address in a memory address unit based on the information provided by said frame clock and a sector select signal from said random process generator subsystem;

receiving in a random access memory information provided by the memory address unit; and

receiving in a numerically controlled oscillator information provided by the random access memory unit, generating as output a varying pixel clock data and forwarding said data to the frame rate timing subsystem.

27. The method of Claim 26, further comprising:

utilizing received data from the memory address unit by random access memory for determining which sector of the random access memory module is to be used during an ensuing interval.

28. The method of Claim 27, wherein the random process generator subsystem generates said sector select signal.

29. The method of Claim 28, wherein the random process generator subsystem generates said sector select signal based on the electrical noise derived from at least one physical process generating said electrical noise.

30. The method of Claim 29, wherein said physical process is the thermal agitation occurring in at least one resistive object.

31. The method of Claim 30, wherein said resistive object is an electrical resistor.

32. The method of Claim 30, wherein said resistive object is a diode.

33. The method of Claim 27, said processing of received motion picture image bit-stream further comprising:

receiving as input said varying pixel clock data and motion picture image data from the frame rate pattern function subsystem;

multiplexing the received clock and image data into a varying frame rate motion picture image bit stream; and

forwarding said multiplexed data to the electronic projector display system.

34. The method of Claim 27, said randomizer subsystem further comprising:

a communications interface for relaying from an external source operational data parameters for the random process generator subsystem, and/or for the frame rate pattern function subsystem.

35. A method for preventing piracy of motion picture images comprising:

utilizing a transmitter subsystem to transmit pulses of energy to a recording device to substantially degrade the images recorded by the recording device from a display screen.

36. The method of Claim 35, wherein said transmitted energy is of sufficient intensity to substantially degrade the quality of the recorded images by the recording device.

37. The method of Claim 36, wherein said transmitting of the energy is in frequencies within the frequency range of red light.

38. The method of Claim 35, further comprising:

transmitting said energy in pulses of on-and-off, said pulses to be of such duration and periodicity as to as to substantially degrade the quality of the recorded images by the recording device.

39. The method of Claim 38, further comprising:

utilizing at least one random generator to determine said duration and periodicity of said pulses of on-and-off.

40. The method of Claim 39, wherein said random generator is a pseudo random generator.

41. The method of Claim 39, wherein said random generator is a true random generator.

42. The method of Claim 35, said utilizing a transmitter subsystem further comprising:

utilizing one or more energy sources for transmitting said energy; and

utilizing an electronic driver module to send one or more operational data for controlling the energy sources.

43. The method of Claim 42, wherein said operational data for controlling the energy sources includes instructions for setting and adjusting power outputs, frequencies, pulse

width and periodicity of said energy, and for controlling switching functions for switching between alternate output frequencies of said energy sources.

44. The method of Claim 43, further comprising:

utilizing a random function generator for providing the timing data in said operational data; and

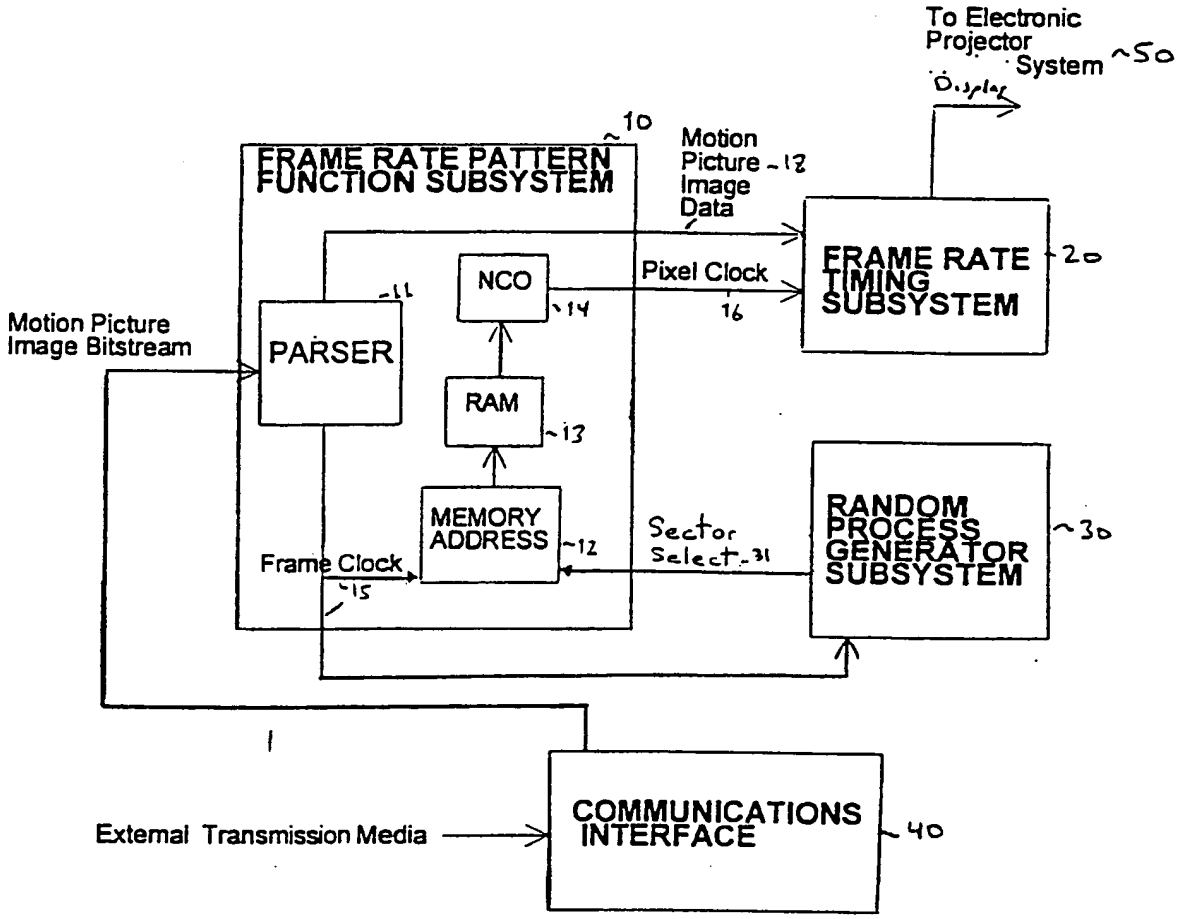
controlling the timing for said setting and adjusting of power outputs, frequencies, pulse width and periodicity of said energy, and for said controlling of switching functions based on said timing data.

45. The method of Claim 35, said transmitter subsystem further comprising:

a communications interface to rely from an external source parameters used by the electronic drive module in said operational data sent to control the energy sources.

46. The method of Claim 42, further comprising:

deploying said energy sources in sufficient quantity and/or optimal positioning to provide substantial coverage of the viewing area in which the motion picture images are displayed.




**RANDOMLY VARYING FRAME RATE SYSTEM**
**SYSTEM AND METHOD FOR PREVENTING CAMCORDER PIRACY OF MOTION PICURE IMAGES**

FIGURE 1.

Randomizer Subsystem

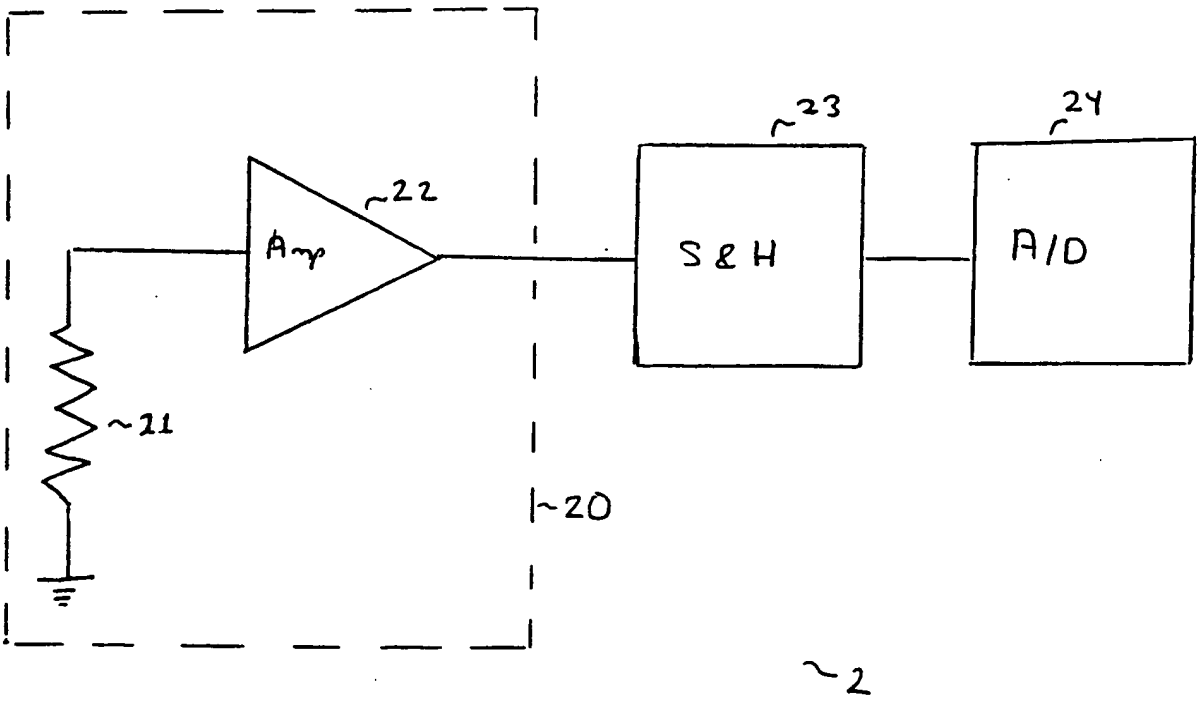



FIG 2 Noise generator

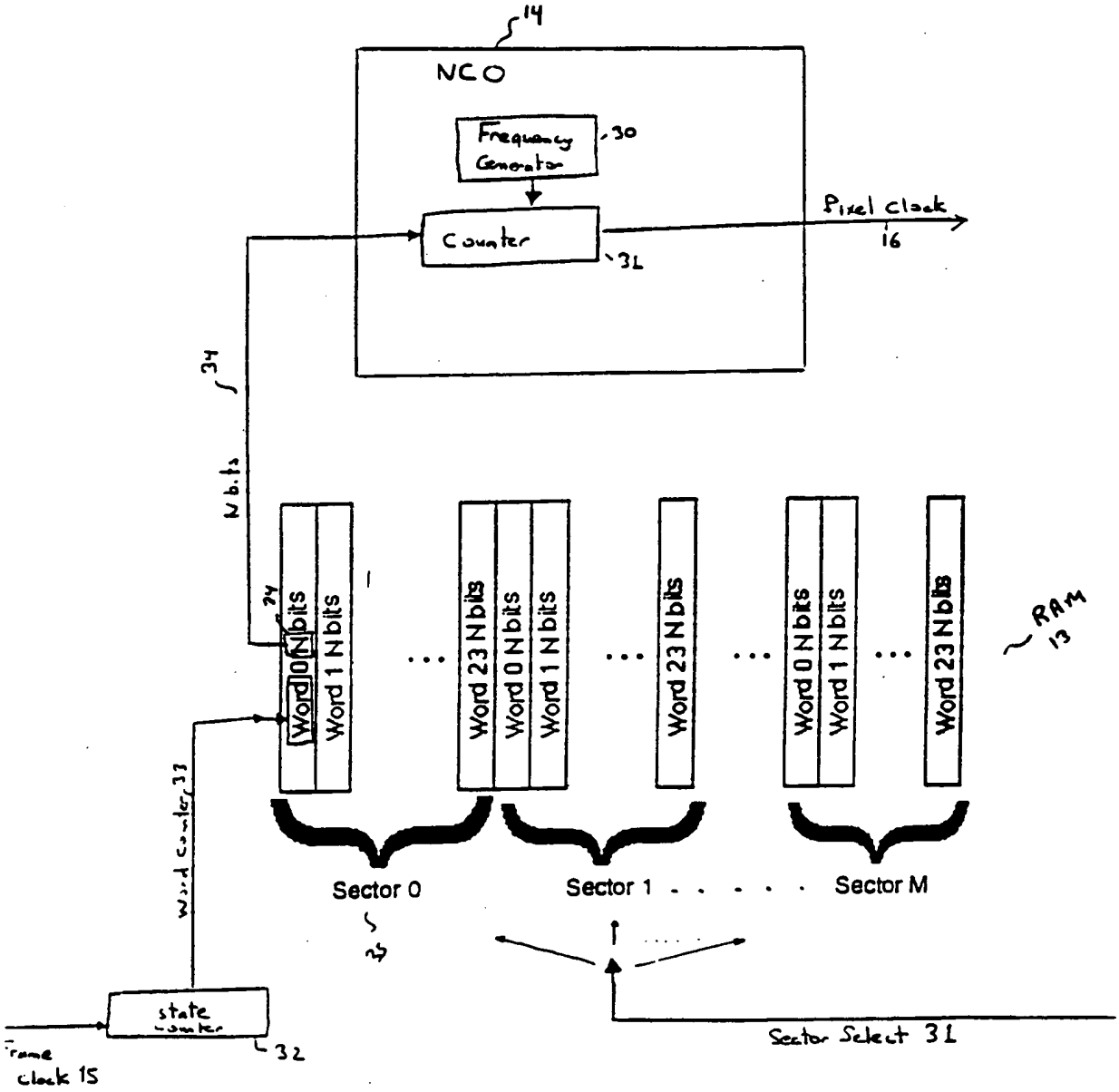
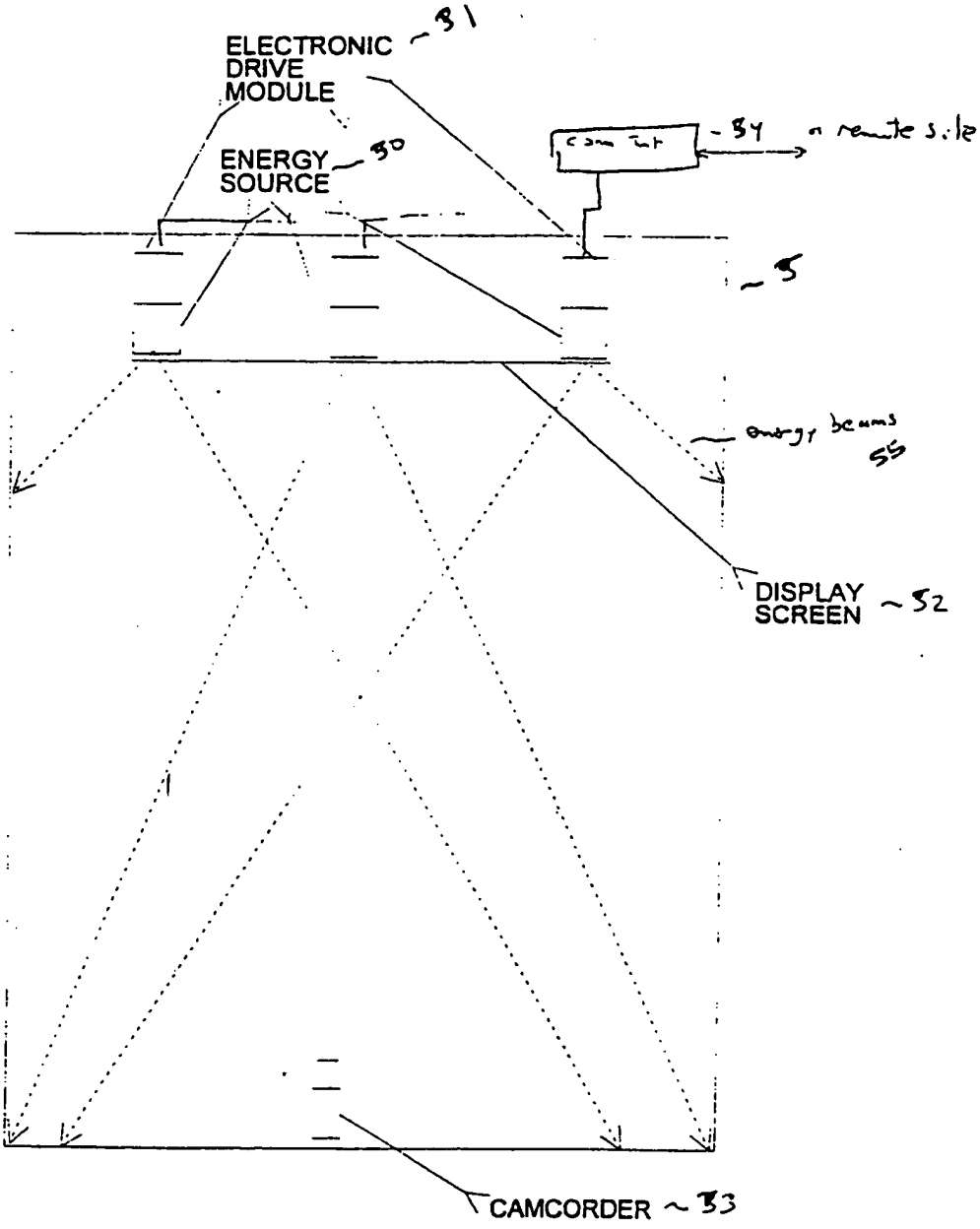

14
NCO
Frequency Generator
30
Counter
32
Pixel clock
16
34
N bits
24
Word 0 N bits
Word 1 N bits
Word 23 N bits
RAM
13
Word counter 33
Sector 0
Sector 1
Sector M
36
state counter
32
Frame clock 15
Sector Select 31

FIG. 3




**CAMCORDER OVERLOAD SYSTEM**
**SYSTEM AND METHOD FOR PREVENTING CAMCORDER PIRACY OF MOTION PICURE IMAGES**

FIGURE 4